

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

Pumping Plant for Water Control

(Number)

Code 533

DEFINITION

A pumping facility installed to transfer water for a conservation need, including removing excess surface or ground water; filling ponds, ditches or wet lands; or for pumping from wells, ponds, streams and other sources.

PURPOSES

To provide a dependable water source or disposal facility for water management on wetlands or to provide a water supply for such purposes as irrigation, recreation, livestock, or wildlife.

CONDITIONS WHERE PRACTICE APPLIES

Wherever water must be pumped to accomplish the conservation objective. It is especially applicable for maintaining critical water levels in existing swamps, marshes, or open water and for providing water sources for newly constructed wetlands and ponds.

CRITERIA

The efficiency of units, type of power, quality of building, automation and accessories installed, shall be in keeping with the value and

importance of the system, and shall accomplish the conservation and environmental objectives. Requirements for pump drainage are in Section 16 of the National Engineering Handbook. Requirements for irrigation pumping are in Section 15 of the National Engineering Handbook.

Pump Requirements. The capacities, range of operating lifts, and general class and efficiency of equipment shall be determined from appropriate technical studies. The size and number of pumps and their performance requirements shall be determined based on the conservation requirements of the system. The total head shall be determined for critical operating conditions taking into account all hydraulic losses. Automatic controls shall be included in the plans as required.

Pumping plants installed to provide an outlet for drainage shall have a capacity equal to the maximum discharge capacity of the tile draining to the pump plus 10 percent.

Minimum drainage coefficients permitted are given in the following table:

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Minimum Water Removal Rate (Inches per Day)

Type of Crop	Surface Runoff or Surface Runoff and Tile Water	Tile Water Only
Field Crops		
Mineral soils	1/2	3/8
Organic soils	3/4	1/2
Special (Truck) Crops		
Mineral soils	3/4	1/2
Organic soils	1 1/2	3/4

Power Units. The power units shall be selected on the basis of costs, operating conditions, conservation needs and objectives, including need for automation. The power unit shall be matched to the pump and be capable of operating the pump effectively within the range of operating conditions. The horsepower requirements, pump efficiency, and the total head on the pump shall be computed.

Suction and Discharge Pipes. The sizes of suction and discharge pipes shall be based on studies of efficiencies and effects on costs and operations. The arrangement and length of discharge pipe shall be based on need for recovery of head through syphonic action, and for delivery of water in keeping with conservation and environmental objectives. Gates, valves, pipe connections, discharge bays, and other protective works shall be installed as needed for satisfactory plant operation.

Building and Accessories. The design of the plant and associated housing, if required, shall consider the need for protecting equipment from the elements, malicious damage, and fire, and the need for equipment maintenance and repairs. The appearance of the plant shall be in keeping with its surrounding environment and its importance or value.

The foundations shall be designed to safely support the loads imposed. Sheet piling or other measures shall be used as required to prevent piping beneath the foundation.

Pumps may be mounted in the open, on piling or in a well or pit.

Suction bays (or sumps) shall be designed to conform to the hydraulic characteristics established by the pump manufacturer.

The discharge bay or connection with distribution system shall be ample to meet hydraulic and structural requirements. Provisions for repair or removal of pumps and engines shall be provided. Trash racks shall be provided as needed to exclude debris and trash from the pump.

CONSIDERATIONS

All structural features and equipment shall provide adequate safety features to protect workers and the public against injury.

Water Quantity

Effect of the pumping plant on upstream and downstream quantity.

Water Quality

1. Sediment production caused by erosion during construction.
2. Possible effects on surface and ground water of spilled fuels and lubricants used to operate and maintain the facility.

PLANS AND SPECIFICATIONS

Plans and specifications for construction of Pumping Plants for Water Control shall be in keeping with this standard and shall describe the requirements for proper installation of the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

None available.

